

AMSTA-AR-FSA-R (70-37a)

11 FEB 2003

MEMORANDUM FOR AMSJM-CCA-R ATTN: JAN TEDELL

SUBJECT: Transmittal of Completed Engineering Action Number R2A2031 and Implementation Information

1. The ARDEC Configuration Control Board Directive (CCBD) dated 2-6-03 and associated change documentation (encl) relative to item nomenclature M67 is provided for your appropriate expeditious action.
2. The AMSTA-AR-FSA-RA POC for this action is Mr. Jahn, ext. 28133, DSN 793-8133.

Encl


JOHN E. HYER
Artillery & Mortars Team Leader

CF:

AMSTA-AR-QAD

AMSTA-AR-FSA-RA

CONFIGURATION REVIEW BOARD DIRECTIVE (CONTINUED)

Page 2 of 2

CONTROL NUMBER
R2A2031

11. remarks

a. Purpose: ECP changes propellant bag material from rayon to acrylic cloth.

b. Recommendation: APPROVE

c Rationale: The rayon propellant bags of the M67 propelling charge had been observed to deteriorate over periods of time to the extent that the bags can no longer hold the propellant. This bag deterioration would affect safety/reliability of the propelling charge. The acrylic bag is more durable and has passed all the required testing.

d. Modification: ~~NONE~~:

e. SQAP AFFECTED: NONE

f. TMs AFFECTED: NONE

g. OTHER SYSTEMS AFFECTED: NONE

h. CONTRACTS AFFECTED: N/A

i. IMPLEMENTATION INSTRUCTIONS: This action is forwarded to AMSJM-CCA~~R~~ in order to provide the configurations manager decision to the OSC for this action under the above contract. Attn: JAN TEDELL

j. READINESS IMPACT: NONE

k. EOD IMPACTED: NONE

l. VE SAVINGS: N/A

m. RATIONALE/CALCULATION FOR COST CONCESSION (RFW) OR CONTRACTUAL COST ADJUSTMENT (RFW, RFD, ECP, VECF): N/A

n. OZONE DEPLETING SUBSTANCE ELIMINATED: NO

CONFIGURATION CONTROL BOARD DIRECTIVE DESIGN ACTIVITY EVALUATION				1. PAN R2A2031			
2a. TYPE ITEM <input checked="" type="checkbox"/> TRANSFERRED PROJECT MANAGED Other _____			2b. TYPE ACTION <input checked="" type="checkbox"/> ECP RFD VEP RFW Other _____ VECP				
3a. CONTRACT(s) AFFECTED			3b. SOLICITATION(s) AFFECTED				
4. APPLICATION <input checked="" type="checkbox"/> Apply to current contracts/solicitations <input checked="" type="checkbox"/> Apply to future applications Formalizes change previously authorized via: _____ Associated or Interface Changes as listed in remarks.			5. COST IMPACT NONE <input checked="" type="checkbox"/> INCREASE \$ <u>\$0.81 per M67</u> DECREASE \$ _____				
6a. RECOMMENDATION TO CONFIGURATION MANAGER: APPROVE <input checked="" type="checkbox"/> APPROVE WITH MODIFICATION DISAPPROVE OTHER: <u>SEE NOTE 3</u>			6b. MODIFICATION(s) TO SUBMITTED ACTION NONE <input checked="" type="checkbox"/> AS FOLLOWS:				
7. POSITION ON RECOMMENDATION TO CONFIGURATION MANAGER							
DOCUMENTS/* DISCIPLINE	IMPACTED YES NO		OFFICE SYMBOL	TELEPHONE	TYPED/PRINTED NAME AND SIGNATURE	CONCUR YES NO	
PRODUCT DRAWINGS	<input checked="" type="checkbox"/>		AMSTA-AR-WEE-B	(973)724-4987	ADRIANA L. ENG <i>Adriana L Eng</i>	<input checked="" type="checkbox"/>	
SPECIFICATIONS/QAPs	<input checked="" type="checkbox"/>		AMSTA-AR-QAT-P <u>SEE NOTE 3.</u>	973.724.3934	HENRY J. VAN DYKE, III <i>na B</i>	<input checked="" type="checkbox"/>	
PACKAGING DATA	<input checked="" type="checkbox"/>		AMSTA-AR-WEP	973 724-2813	PETER J. SMITH JR. <i>Peter J Smith Jr</i>	<input checked="" type="checkbox"/>	
SOFTWARE ENGINEERING	<input checked="" type="checkbox"/>		AMSTA-AR-FSA-P	973 724-5628	EDWIN R. ACKERMAN <i>Edwin R Ackerman</i>	<input checked="" type="checkbox"/>	
MAINTENANCE	<input checked="" type="checkbox"/>		AMSTA-AR-WEE-A		STEPHEN SCHOONMAKER <i>Stephen Schoonmaker</i>	<input checked="" type="checkbox"/>	
OTHER (Specify)		<input checked="" type="checkbox"/>	AMSTA-AR-QAW-S		Fiembun <i>Fiembun</i>	<input checked="" type="checkbox"/>	
VALUE ENGINEERING							
<p>* NOTE: A Notice of Revision (NOR) is required for each document needing revision when a change is recommended for approval.</p> <p>REMARKS</p> <p>Recommend approval of this ECP based on the following reasons: (1) the acrylic propellant bags are significantly more resistant to deterioration and have a much longer shelf life than the rayon propellant bags, and (2) the acrylic propellant bags are equal/better than the rayon propellant bags in terms of residue, performance, and tensile strength.</p> <p style="text-align: center; font-size: 1.2em;">SEE NOTE 3 ATTACHED FOR MODIFICATIONS TO THIS ECP.</p>							
9a. OFFICE SYMBOL <i>AMSTA-AR-WEE-B</i>		9b. TYPED/PRINTED NAME AND TITLE <i>ADRIANA ENG CHEMICAL ENGINEER</i>		9c. SIGNATURE <i>Adriana L Eng</i>		19d. DATE <i>12/12/02</i> 9e. TELEPHONE <i>4987</i>	

ESA-RA

ENGINEERING CHANGE PROPOSAL (ECP), PAGE 1				1. DATE (YYMMDD) 021220		Form Approved OMB No. 0704-0188	
<small>Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.</small> PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSES. RETURN COMPLETED FORM TO THE GOVERNMENT ISSUING CONTRACTING OFFICER FOR THE CONTRACT / PROCURING ACTIVITY NUMBER LISTED IN ITEM 2 OF THIS FORM.						2. PROCURING ACTIVITY NO. R2A2031	
						3. DODAAC	
4. ORIGINATOR a. TYPED NAME (First, Middle Initial, Last) ADRIANA L. ENG		b. ADDRESS (Street, City, State, Zip Code) US ARMY ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000			5. CLASS OF ECP 1		
		6. JUST. CODE D		7. PRIORITY R			
8. ECP DESIGNATION a. MODEL/TYPE M67 b. CAGE CODE 19203 c. SYSTEM DESIGNATION 105MM ARTILLERY AMMUNITIONS				9. BASELINE AFFECTED <input type="checkbox"/> FUNCTIONAL <input checked="" type="checkbox"/> PRODUCT <input type="checkbox"/> ALLOCATED			
d. ECP NO. R2A2031		e. TYPE		f. REV		10. OTHER SYS./CONFIG. ITEMS AFFECTED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
11. SPECIFICATIONS AFFECTED				12. DRAWINGS AFFECTED			
	CAGE Code	Specification/Document No.	Rev.	SCN	CAGE Code	Number	
a. SYSTEM							
b. DEVELOPMENT					19203	9205472	
c. PRODUCT					19203	9288695	
13. TITLE OF CHANGE CHANGE PROPELLANT BAG MATERIAL FROM RAYON CLOTH TO ACRYLIC CLOTH							
14. CONTRACT NO. AND LINE ITEM N/A				15. PROCURING CONTRACTING OFFICER a. NAME (First, Middle Initial, Last) NORMAN BROWN, b. CODE WS2PIJ c. TELEPHONE NO. DSN793-3709			
16. CONFIGURATION ITEM NOMENCLATURE CRTG, 105MM, M314A3, M927, M1, M60A2, M84, M84A1, M84B1, XM916, M629						17. IN PRODUCTION <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
18. ALL LOWER LEVEL ITEMS AFFECTED							
a. NOMENCLATURE 105MM, CHARGE, PROPELLING, M67			b. PART NO. 9288695 AND 9205472		c. NSN		
19. DESCRIPTION OF CHANGE SEE CONTINUATION SHEET.							
20. NEED FOR CHANGE SEE CONTINUATION SHEET.							
21. PRODUCTION EFFECTIVITY BY SERIAL NUMBER N/A				22. EFFECT ON PRODUCTION DELIVERY SCHEDULE N/A			
23. RETROFIT							
a. RECOMMENDED ITEM EFFECTIVITY N/A				b. SHIP / VEHICLE CLASS AFFECTED N/A			
c. ESTIMATED KIT DELIVERY SCHEDULE N/A				d. LOCATIONS OR SHIP / VEHICLE NUMBERS AFFECTED N/A			
24. ESTIMATED COSTS / SAVINGS UNDER CONTRACT N/A				25. ESTIMATED NET TOTAL COSTS / SAVINGS N/A			
26. SUBMITTING ACTIVITY a. AUTHORIZED SIGNATURE <i>Adriana L. Eng</i>				b. TITLE CHEMICAL ENGINEER			
27. APPROVAL / DISAPPROVAL							
a. CLASS I <input checked="" type="checkbox"/> APPROVAL RECOMMENDED <input type="checkbox"/> DISAPPROVAL RECOMMENDED		b. CLASS II <input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED		c. CLASS II <input type="checkbox"/> CONCUR IN CLASSIFICATION OF CHANGE <input type="checkbox"/> DO NOT CONCUR IN CLASSIFICATION OF CHANGE			
d. GOVERNMENT ACTIVITY AMSTA-AR-WEE-B				e. SIGNATURE <i>Arthur J. Heyderman</i>		f. DATE SIGNED (YYMMDD) 021220	
g. APPROVAL <input checked="" type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED		h. GOVERNMENT ACTIVITY TACOM ARDEC, AMSTA-AR-PSA		i. SIGNATURE <i>Arthur J. Heyderman</i>		j. DATE SIGNED (YYMMDD) 2003 0211	

23 DEC 2002

12-13-02

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Chief, ESAC Prod & Log Eng Spt Team

Block 10. OTHER SYSTEMS/CONFIGURATION ITEMS AFFECTED

M314A3 Illuminating, M927 HERA, M1 HE, M60A2 Smoke, M84 Smoke (M84, M84A1, M84B1), XM916 DPICM, M629 Tactical CS.

Block 19. DESCRIPTION OF CHANGE

This ECP replaces the existing rayon propellant bags with more durable acrylic propellant bags for the 105mm M67 Propelling Charge.

Block 20. NEED FOR CHANGE:

The rayon propellant bags of the M67 propelling charge had been observed to deteriorate over periods of time to the extent that the bags can no longer safely hold the propellant. This propellant bag deterioration would affect safety/reliability of the M67 propelling charge, reduce service life of the 105mm tactical rounds, and incur costly maintenance rework. This ECP resolves propellant bag deterioration problem by replacing the rayon propellant bags with a durable acrylic propellant bags.

The M67 could use either laminated (lead foil) cloth or lead foil without lamination as the decoppering agent in accordance with the TDP. Due to environmental hazard, the existing adhesive used for lamination is not available from any US source for test or production purpose. Therefore, the laminated (lead foil) cloth is cancelled by this ECP.

QUALIFICATION TEST SUMMARY:

1. Compatibility Test:

A test was conducted in accordance with MIL-STD-286 (Method 408.1.1) to verify there was no adverse reaction between the acrylic cloth and M1 propellant (attachment 1).

2. Ballistic Firing Tests:

As shown in Tables 1-3, ballistic Uniformity Test results indicated that the M67 propelling charges with the proposed acrylic bags met the muzzle velocity and pressure requirements in accordance with MIL-P-60318.

3. Residue Evaluation:

The acrylic bags left practically no residue after ballistic firing tests during Uniformity Test (Figure 3) and Sequential Environmental Test (Table 8).

4. Sequential Environmental Test:

A total of 120 test rounds (with newly manufactured acrylic propellant bags), and a total of 120 control rounds (with newly manufactured rayon propellant bags) passed the sequential

environmental test in accordance with Figure 7 of ITOP 4-2-504. No hazard such as burning or detonation occurred during handling, transportation, storage and ballistic firing.

Table 4 summarizes the number of damaged M67 propelling charges after 120 test rounds and 120 control rounds were subjected to logistic vibrations. Approximately 5%, 3%, 24% and 68% of the damages were found on zone 1, zone 5, zone 6 and zone 7 bags respectively. Table 5 summarizes the number of damaged bags with propellant leakage after logistic vibrations. It's important to note that the acrylic bags were equal or better than the rayon bags in terms of extend/amount of bag damage.

Table 6 summarizes the number of damages/holes found on 20 test rounds and 20 control rounds after loose cargo with fiber containers.

Table 7 summarizes ballistic test results of a total of 80 rounds which had been subjected to logistic vibrations. Table 8 shows percentage of these M67 with recoverable cloth residue.

5. Propellant Cloth Shelf Life Study:

Deleted per note 3

An accelerated aging test was conducted to measure the tensile strength loss of both rayon and acrylic propellant bags at elevated constant temperatures (65°C, 75°C, 85°C, 95°C) at 75% relative humidity. Results of these tensile strength data were fit to the following Arrhenius degradation model (Ref. 1). Once the degradation is fitted, it can be used to predicted tensile strength loss for service conditions.

$$\text{Log}(S) = \alpha + t\beta \exp(-\gamma/T)$$

Where: S = tensile strength, t = time, T = temperature (absolute). The coefficients are estimated from regression of the tensile strength data. Plots of the fraction loss in tensile strength using the above degradation modeling techniques for each cloth type are shown in Figures 1 and 2.

The predicted mean lifetimes at the service temperatures are shown in Table 9. At these given temperatures, the mean lifetimes of the acrylic propellant bags are estimated to be 9 to 11 times longer than those of the rayon propellant bags. Since the propellant bags should survive rough handling/transportation, it is proposed 10% loss in tensile strength be used as the end point for shelf life prediction. Based on this, mean lifetime of the acrylic propellant bags are estimated to exceed 20 years in controlled storage and far exceed 2 years in uncontrolled storage.

6. Reference:

Nelson, Wayne (1990), Accelerated Testing: Statistical Models, Test Plans, and Data Analyses, John Wiley & Sons, Inc., New York.

Addition per Note 3:

5. Result of accelerated aging test:

Acrylic cloth shows a much greater resistance to degradation based on accelerated aging data taken at 65, 75, and 85 degrees C and 75 % RH. Each data point in the test matrix is replicated four times. There is statistical evidence that the acrylic fiber is more heat and acid resistant at the accelerating conditions. If the data is extrapolated to ambient, a greater service life will be obtained using the acrylic fiber. "

Table 1. Uniformity Test at + 70 deg F

	Test rounds (with acrylic bags)		Control rounds (with rayon bags)	
Zone	Velocity (ft/sec)	Pressure (kpsi)	Velocity (ft/sec)	Pressure (kpsi)
3	Mean=760 Std dev=2.3	Mean=9.3 Std dev=0.2	Mean=763 Std dev=2.7	Mean=9.5 Std dev=0.1
7	Mean=1527 Std dev=3.0	Mean=35.8 Std dev=0.5	Mean=1530 Std dev=2.9	Mean=35.3 Std dev=1.8

Table 2. Uniformity Test at + 145 deg F

	Test rounds (with acrylic bags)		Control rounds (with rayon bags)	
Zone	Velocity (ft/sec)	Pressure (kpsi)	Velocity (ft/sec)	Pressure (kpsi)
3	Mean=775 Std dev=2.8	Mean=10.2 Std dev=0.1	Mean=783 Std dev=3.1	Mean=10.4 Std dev=0.2
7	Mean=1571 Std dev=2.9	Mean=39.4 Std dev=0.2	Mean=1577 Std dev=1.7	Mean=39.6 Std dev=1.0

Table 3. Uniformity Test at -50 deg F

	Test rounds (with acrylic bags)		Control rounds (with rayon bags)	
Zone	Velocity (ft/sec)	Pressure (kpsi)	Velocity (ft/sec)	Pressure (kpsi)
3	Mean=737 Std dev=2.4	Mean=8.6 Std dev=0.2	Mean=744 Std dev=2.7	Mean=8.8 Std dev=0.2
7	Mean=1489 Std dev=3.9	Mean=31.6 Std dev=0.5	Mean=1498 Std dev=4.6	Mean=32.2 Std dev=0.7

Table 4. Sequential Environmental: Number of Damaged M67 after Logistic Vibrations

Test Temperature	Acrylic Bags	Rayon Bags
+145 deg F	14	19
- 50 deg F	1	2

Table 5. Sequential Environmental: Number of Damaged M67 with Propellant Leakage after Logistic Vibrations

Test Temperature	Acrylic Bags	Rayon Bags
+145 deg F	4	9
- 50 deg F	0	1

Table 6. Sequential-Environmental: Total Number of Bag Damages after Loose Cargo Vibration (Fiber Container)

Test Temperature	Acrylic Bags	Rayon Bags
+145 deg F	24	36
- 50 deg F	15	25

Table 7. Performance Phase of Sequential Environmental Test: Ballistic Test Results

Test Temperature	Test rounds (with acrylic bags)		Control rounds (with rayon bags)	
	Velocity (ft/sec)	Pressure (kpsi)	Velocity (ft/sec)	Pressure (kpsi)
+145 deg F	Mean=1581 Std dev=2.3	Mean=40.7 Std dev=0.5	Mean=1589 Std dev=11.0	Mean=40.9 Std dev=0.7
-50 deg F	Mean=1495 Std dev=3.3	Mean=31.9 Std dev=0.6	Mean=1510 Std dev=3.2	Mean=33.3 Std dev=0.5

Table 8. Performance Phase of Sequential Environmental Test: Percentage of M67 with Recoverable Cloth Residue after Ballistic Firing

Test Temperature	Acrylic Bags	Rayon Bags
+145 deg F	0%	25%
-50 deg F	0%	55%

Table 9. Predicted Mean Lifetimes Based on 10% Loss in Tensile Strength

	Acrylic cloth	Rayon cloth	Acrylic better than rayon by
25°C & 75% RH	143 years	16 years	9 times
35.38°C & 75% RH	37 years	3.4 years	11 times

Deleted
per note 3.

Figure 1 & 2 deleted per NOTE 3.

PAN R2A2031

Configuration Control Board Evaluation Form

Remark - continuation.

NOTE 3: Delete Paragraphs 5, 6, Table 9 and Figure 1 & 2 on service life prediction. Service life of the Acrylic cloth will be addressed by a separate document to be submitted at a later date. It is also recommended that the service life prediction study be coordinated with Predictive Engineering (Dr. Eric Bixon).

Add Paragraph 5 to the ECP continuation sheet as below:

"5. Result of accelerated aging test:

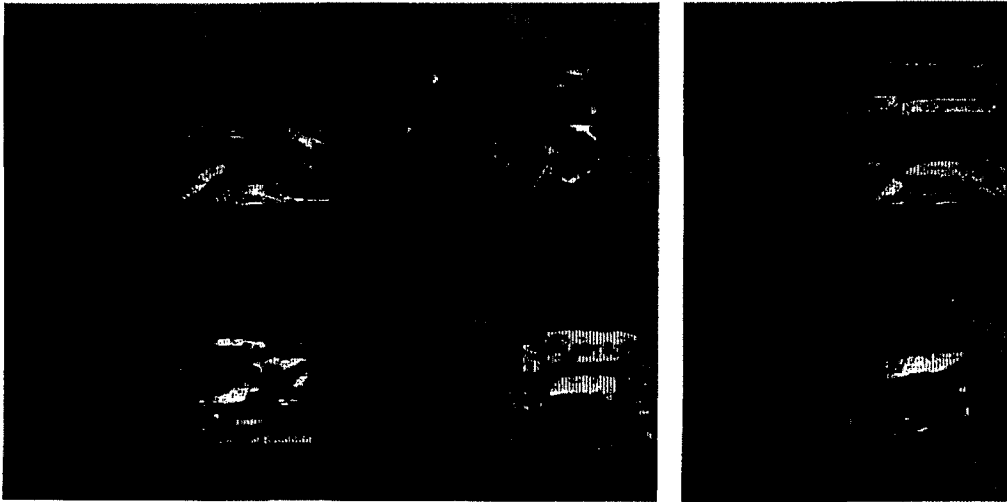
Acrylic cloth shows a much greater resistance to degradation based on accelerated aging data taken at 65, 75, and 85 degrees C and 75 % RH. Each data point in the test matrix is replicated four times. There is statistical evidence that the acrylic fiber is more heat and acid resistant at the accelerating conditions. If the data is extrapolated to ambient, a greater service life will be obtained using the acrylic fiber. "

Dr ERIC R. Bixon
RESEARCH DIRECTOR Predictive Engineering
AMSTA-AR-QAT-P
DEC 11, 2002
AV 880-3705
email ebixon@pica.army.mil

Figure 3. Cloth Residue

➤ **ACRYLIC - NO RECOVERABLE RESIDUE**

➤ **RAYON RESIDUE:**



AMSTA-AR-AEE -WECAC
Compatibility Study Report, Analytical Research & Services

DATE March 15, 2002

REPORT NO. EWD-05 -02/C

CUSTOMER

Requester: A.Eng
Charge No.:
Requirement: Compatibility Study of M1 Propellant, Lot. No.
RAD68051 with Acrylic Cloth Material

TEST

Test Performed: Vacuum Compatibility at 100°C for 40 hours
Method: Mil-Std 286-C, Method 408.1.1

DATA

Component/Computation ml gas at STP

Component 1 M1 Propellant

Component 2 Acrylic Cloth

Control (1 + 2)

Mixture (1+2) M1 / Acrylic Cloth 6.38

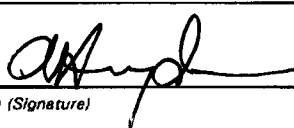
Mixture- Control
CONCLUSION

- (X) Compatible
() Marginally Compatible
() Incompatible

Work By Keith Rowe

Approved By





NOTICE OF REVISION (NOR)		1. DATE (YYMMDD)	Form Approved OMB No. 0704-0188
THIS REVISION DESCRIBED BELOW HAS BEEN AUTHORIZED FOR THE DOCUMENT LISTED		2 12 20	
Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington DC 20503. PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSES. RETURN COMPLETED FORM TO THE GOVERNMENT ISSUING CONTRACTING OFFICER FOR THE CONTRACT/PROCURING ACTIVITY NUMBER LISTED IN ITEM 2 OF THIS FORM.			2. PROCURING ACTIVITY NO.
			R2A2031
			3. DODAAC
4. ORIGINATOR		5. CAGE CODE	6. NOR NO.
a. TYPED NAME (First, Middle Initial, Last) ADRIANA L. ENG		19200	R2A2031
b. ADDRESS (Street, City, State, Zip Code) US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000		7. CAGE CODE 19203	8. DOCUMENT NO. 9205470
9. TITLE OF DOCUMENT BAG		10. REVISION LETTER	
		a. CURRENT L	b. NEW M
11. ECP NO. R2A2031			
12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES CRTG, 105MM, M314A3 ILLUMINATING, M927 HERA, M1 HE, M60A2 SMOKE, M84 SMOKE (M84, M84A1, M84B1), XM916 DPICM, M629 TACTICAL CS			
13. DESCRIPTION OF REVISION			
ZONE B8			
NOTE 2, CHANGE FROM: "MATERIAL: CLOTH, SPUN, VISCOSE RAYON, RESIN IMPREGNATED CLASS I, SPEC MIL-C-43157 (NOTE 12)." TO: "MATERIAL: CLOTH, ACRYLIC, CLASS II, SPEC MIL-C-12800."			
ZONE A8			
NOTE 10, CHANGE FROM: "VIEW "A" IS FOR INCREMENT NO. 5 (PART NO. 9205470-5) ONLY. LEAD FOIL IS SEWN TO CLOTH OR LEAD FOIL - LAMINATED CLOTH - 9271884 IS USED FOR THIS SIDE OF BAG." TO: "VIEW "A" IS FOR INCREMENT NO. 5 (PART NO. 9205470-5) ONLY. LEAD FOIL - 9205469 IS SEWN TO CLOTH."			
NOTE 12, DELETE IN ITS ENTIRETY. DELETE "ALTERNATIVE MATERIAL: CLOTH, POLYESTER-VISCOSE RAYON, CLASS 7, SPEC MIL-C-43153."			
NOTE 13, CHANGE FROM: "13" TO: "12"			
14. THIS SECTION FOR GOVERNMENT USE ONLY			
a. (X one) <input checked="" type="checkbox"/> (1) Existing document supplemented by this NOR may be used in manufacture. <input type="checkbox"/> (2) Revised document must be received before manufacturer may incorporate this change. <input type="checkbox"/> (3) Custodian of master document shall make above revision and furnish revised document.			
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT TACOM-ARDEC, AMSTA-AR-FSAC		c. TYPED NAME (First, Middle Initial, Last)	
d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team		e. SIGNATURE 	
f. DATE SIGNED (YYMMDD) 2003 02 11			
15.a. ACTIVITY ACCOMPLISHING REVISION		b. REVISION COMPLETED (Signature)	
c. DATE SIGNED (YYMMDD)			

DD FORM 1695, APR 92 (EF-V1) (PerFORM PRO)

PREVIOUS EDITIONS ARE OBSOLETE.

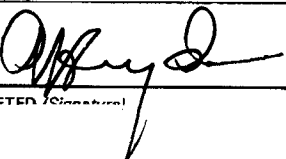
DISTRIBUTION STATEMENT A: UNLIMITED / OF 11

NOTICE OF REVISION (NOR) THIS REVISION DESCRIBED BELOW HAS BEEN AUTHORIZED FOR THE DOCUMENT LISTED		1. DATE (YYMMDD) 2 12 20	Form Approved OMB No. 0704-0188
<small>Public reporting burden for this collection of information is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington DC 20503. PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSES. RETURN COMPLETED FORM TO THE GOVERNMENT ISSUING CONTRACTING OFFICER FOR THE CONTRACT/PROCURING ACTIVITY NUMBER LISTED IN ITEM 2 OF THIS FORM.</small>			2. PROCURING ACTIVITY NO. R2A2031
4. ORIGINATOR a. TYPED NAME (First, Middle Initial, Last) ADRIANA L. ENG			3. DODAAC
b. ADDRESS (Street, City, State, Zip Code) US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000		5. CAGE CODE 19200	6. NOR NO. R2A2031
		7. CAGE CODE 19203	8. DOCUMENT NO. 9271884
9. TITLE OF DOCUMENT CLOTH, LAMINATED (LEAD FOIL)		10. REVISION LETTER a. CURRENT A	
		b. NEW B	
11. ECP NO. R2A2031			
12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES CRTG, 105MM, M314A3 ILLUMINATING, M927 HERA, M1 HE, M60A2 SMOKE, M84 SMOKE (M84, M84A1, M84B1), XM916 DPICM, M629 TACTICAL CS			
13. DESCRIPTION OF REVISION ADD: "OBSOLETE"			
14. THIS SECTION FOR GOVERNMENT USE ONLY			
a. (X one) <input checked="" type="checkbox"/> (1) Existing document supplemented by this NOR may be used in manufacture. <input type="checkbox"/> (2) Revised document must be received before manufacturer may incorporate this change. <input type="checkbox"/> (3) Custodian of master document shall make above revision and furnish revised document.			
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT TACOM-ARDEC, AMSTA-AR-TSA-R		c. TYPED NAME (First, Middle Initial, Last)	
d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team		e. SIGNATURE 	
f. DATE SIGNED (YYMMDD) 2003 02 11			
15.a. ACTIVITY ACCOMPLISHING REVISION		b. REVISION COMPLETED (Signature) 	
		c. DATE SIGNED (YYMMDD)	

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PREVIOUS EDITIONS ARE OBSOLETE.

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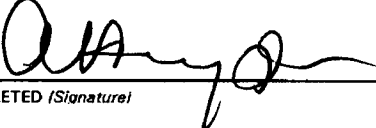
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4. ORIGINATOR a. TYPED NAME (First, Middle Initial, Last) ADRIANA L. ENG			3. DODAAC
b. ADDRESS (Street, City, State, Zip Code) US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000		5. CAGE CODE 19200	6. NOR NO. R2A2031
		7. CAGE CODE 19203	8. DOCUMENT NO. 9288696
9. TITLE OF DOCUMENT INCREMENT LOADING ASSEMBLY		10. REVISION LETTER a. CURRENT C	
		b. NEW D	
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12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES CRTG, 105MM, M314A3 ILLUMINATING, M927 HERA, M1 HE, M60A2 SMOKE, M84 SMOKE (M84, M84A1, M84B1), XM916 DPICM, M629 TACTICAL CS			
13. DESCRIPTION OF REVISION DOCUMENT NOMENCLATURE, CHANGE FROM: "CLOTH, SPUN VISCOSE RAYON, RESIN IMPREGNATED W/AMEND #2" TO: "CLOTH, ACRYLIC, CLASS II" DELETE: "CLOTH, CARTRIDGE, POLYESTER-VISCOSE RAYON (FOR CARTRIDGE BAGS) W/AMEND #3" SPECIFICATION INFO, CHANGE FROM: "MIL-C-43157" TO: "MIL-C-12800" DELETE: "MIL-C-43153"			
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b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT TACOM-ARDEC, AMSTA-AR-FSAC		c. TYPED NAME (First, Middle Initial, Last)	
d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team		e. SIGNATURE 	
f. DATE SIGNED (YYMMDD) 2003 02 11			
15.a. ACTIVITY ACCOMPLISHING REVISION		b. REVISION COMPLETED	
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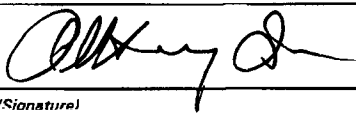
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b. ADDRESS (Street, City, State, Zip Code) US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000		5. CAGE CODE 19200 7. CAGE CODE 19203	6. NOR NO. R2A2031 8. DOCUMENT NO. 9288696-1
9. TITLE OF DOCUMENT INCREMENT LOADING ASSEMBLY		10. REVISION LETTER a. CURRENT C b. NEW D	11. ECP NO. R2A2031
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d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team		e. SIGNATURE 	f. DATE SIGNED (YYMMDD) 2003 02 11
15.a. ACTIVITY ACCOMPLISHING REVISION		b. REVISION COMPLETED (Signature)	c. DATE SIGNED (YYMMDD)

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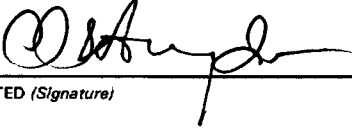
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4. ORIGINATOR		5. CAGE CODE	6. NOR NO.
a. TYPED NAME (First, Middle Initial, Last)	b. ADDRESS (Street, City, State, Zip Code)	19200	R2A2031
ADRIANA L. ENG	US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000	7. CAGE CODE 19203	8. DOCUMENT NO. 9288696-2
9. TITLE OF DOCUMENT INCREMENT LOADING ASSEMBLY		10. REVISION LETTER	11. ECP NO. R2A2031
		a. CURRENT C	b. NEW D
12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES CRTG, 105MM, M314A3 ILLUMINATING, M927 HERA, M1 HE, M60A2 SMOKE, M84 SMOKE (M84, M84A1, M84B1), XM916 DPICM, M629 TACTICAL CS			
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d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team	e. SIGNATURE 		f. DATE SIGNED (YYMMDD) 2003 02 11
15.a. ACTIVITY ACCOMPLISHING REVISION	b. REVISION COMPLETED (Signature)		c. DATE SIGNED (YYMMDD)

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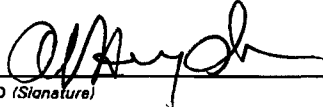
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b. ADDRESS (Street, City, State, Zip Code) US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000		5. CAGE CODE 19200	6. NOR NO. R2A2031
		7. CAGE CODE 19203	8. DOCUMENT NO. 9288696-3
9. TITLE OF DOCUMENT INCREMENT LOADING ASSEMBLY		10. REVISION LETTER a. CURRENT C	11. ECP NO. R2A2031
		b. NEW D	
12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES CRTG, 105MM, M314A3 ILLUMINATING, M927 HERA, M1 HE, M60A2 SMOKE, M84 SMOKE (M84, M84A1, M84B1), XM916 DPICM, M629 TACTICAL CS			
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d. TITLE ARTHUR J. CYDERMAN Chief, FSAC Prod & Log Eng Spt Team		e. SIGNATURE 	
f. DATE SIGNED (YYMMDD) 2003 02 11			
15.a. ACTIVITY ACCOMPLISHING REVISION		b. REVISION COMPLETED (Signature)	
		c. DATE SIGNED (YYMMDD) 12/1/03	

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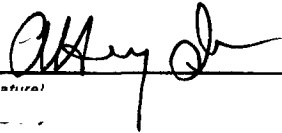
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4. ORIGINATOR a. TYPED NAME (First, Middle Initial, Last) ADRIANA L. ENG			3. DODAAC
b. ADDRESS (Street, City, State, Zip Code) US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000		5. CAGE CODE 19200	6. NOR NO. R2A2031
		7. CAGE CODE 19203	8. DOCUMENT NO. 9288696-4
9. TITLE OF DOCUMENT INCREMENT LOADING ASSEMBLY		10. REVISION LETTER a. CURRENT C	
		b. NEW D	
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b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT TACOM-ARDEC, AMSTA-AR-PSA-R		c. TYPED NAME (First, Middle Initial, Last)	
d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team		e. SIGNATURE 	
f. DATE SIGNED (YYMMDD) 20030211			
15.a. ACTIVITY ACCOMPLISHING REVISION		b. REVISION COMPLETED (Signature)	
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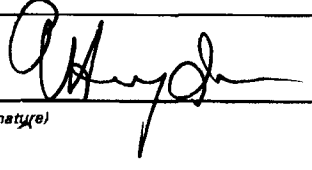
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d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team		e. SIGNATURE 	
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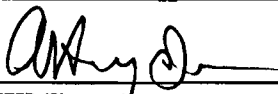
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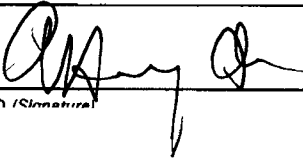
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TACOM-ARDEC, AMSTA-AR-WEE-B			
d. TITLE	e. SIGNATURE	f. DATE SIGNED (YYMMDD)	
ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team		2003 02 11	
15.a. ACTIVITY ACCOMPLISHING REVISION	b. REVISION COMPLETED (Signature)	c. DATE SIGNED (YYMMDD)	
		1 6 9 5	

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THIS REVISION DESCRIBED BELOW HAS BEEN AUTHORIZED FOR THE DOCUMENT LISTED			
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		3. DODAAC	
4. ORIGINATOR		5. CAGE CODE	6. NOR NO.
a. TYPED NAME (First, Middle Initial, Last) ADRIANA L. ENG	b. ADDRESS (Street, City, State, Zip Code) US ARMY TACOM-ARDEC AMSTA-AR-WEE-B PICATINNY ARSENAL, NJ 07806-5000	19200	R2A2031
		7. CAGE CODE	8. DOCUMENT NO.
		19203	9288697
9. TITLE OF DOCUMENT BAG		10. REVISION LETTER	
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12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES CRTG, 105MM, M314A3 ILLUMINATING, M927 HERA, M1 HE, M60A2 SMOKE, M84 SMOKE (M84, M84A1, M84B1), XM916 DPICM, M629 TACTICAL CS			
13. DESCRIPTION OF REVISION			
ZONE B8			
NOTE 2, CHANGE			
FROM: "MATERIAL: CLOTH, SPUN, VISCOSE RAYON, RESIN IMPREGNATED CLASS I, SPEC MIL-C-43157 (NOTE 12)."			
TO: "MATERIAL: CLOTH, ACRYLIC, CLASS II, SPEC MIL-C-12800."			
ZONE A8			
NOTE 12			
DELETE "ALTERNATIVE MATERIAL: CLOTH, POLYESTER-VISCOSE RAYON, CLASS 7, SPEC MIL-C-43153."			
14. THIS SECTION FOR GOVERNMENT USE ONLY			
a. (X one)	<input checked="" type="checkbox"/> (1) Existing document supplemented by this NOR may be used in manufacture. <input type="checkbox"/> (2) Revised document must be received before manufacturer may incorporate this change. <input type="checkbox"/> (3) Custodian of master document shall make above revision and furnish revised document.		
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT TACOM-ARDEC, AMSTA-AR-PSA-R		c. TYPED NAME (First, Middle Initial, Last)	
d. TITLE ARTHUR J. HEYDERMAN Chief, FSAC Prod & Log Eng Spt Team	e. SIGNATURE 		f. DATE SIGNED (YYMMDD) 2003 02 11
15.a. ACTIVITY ACCOMPLISHING REVISION	b. REVISION COMPLETED (Signature)		c. DATE SIGNED (YYMMDD)

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